Spruce Beetle on the Grand Mesa, Uncompahgre, and Gunnison National Forests

Delta, Colorado
Nov 13, 2013

Spruce Beetle Biology

Spruce Beetle Biology

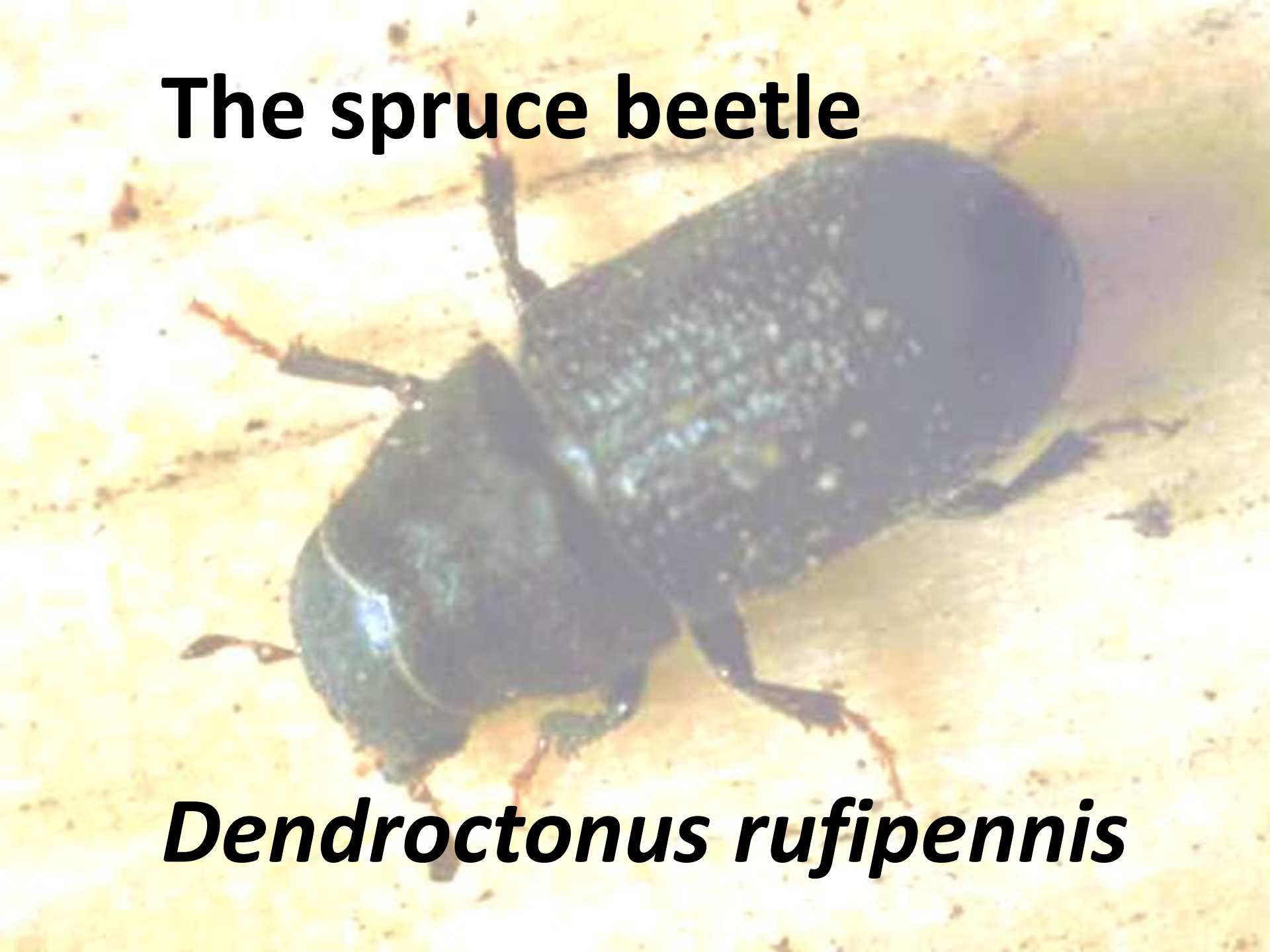
What is happening on the GMUG

Spruce Beetle Biology

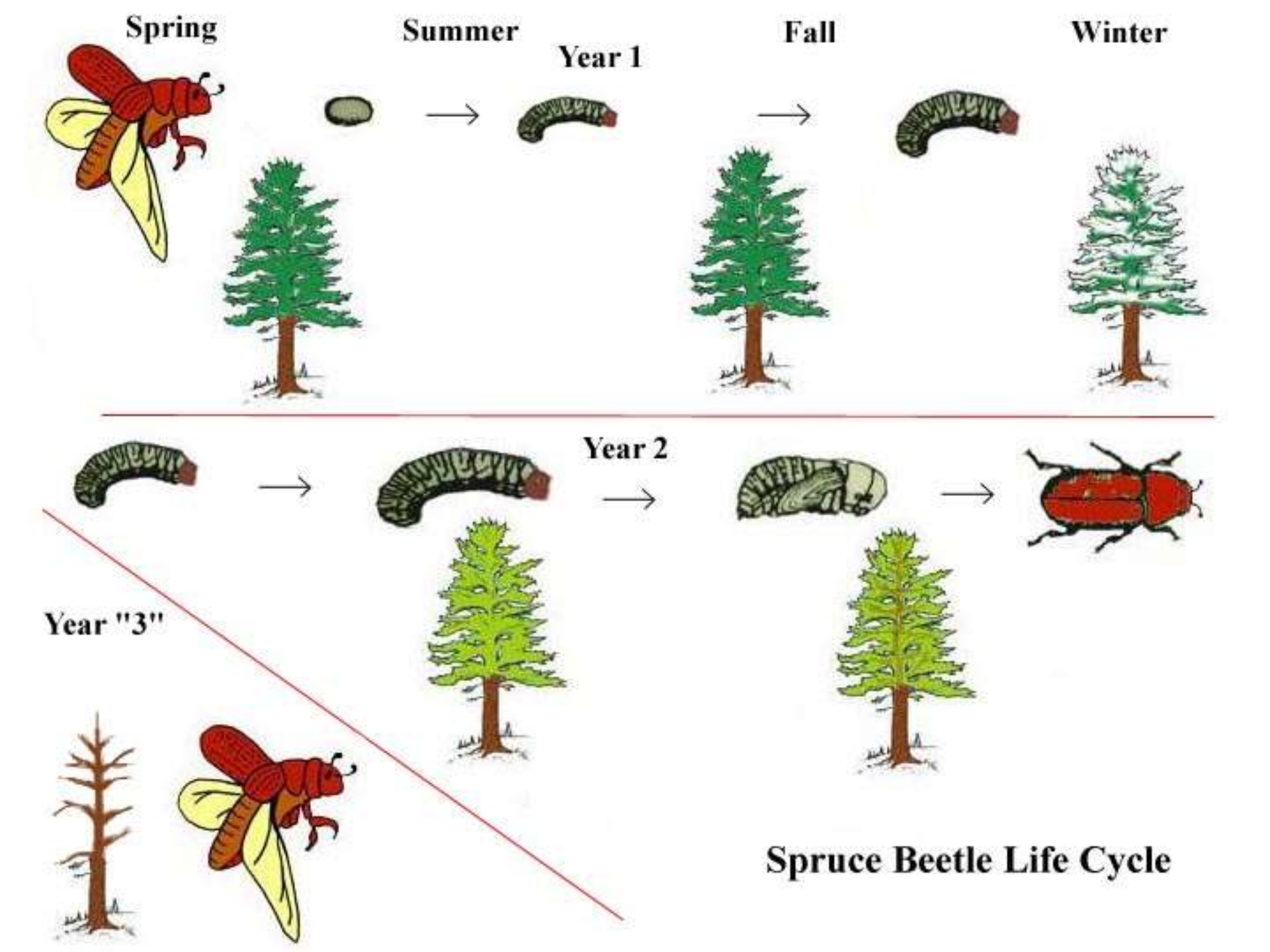
What is happening on the GMUG

What can be done about it

The spruce beetle



Dendroctonus rufipennis


Spring
Summer
Year 1
Fall
Winter
Year 2
Year "3"
Spruce Beetle Life Cycle

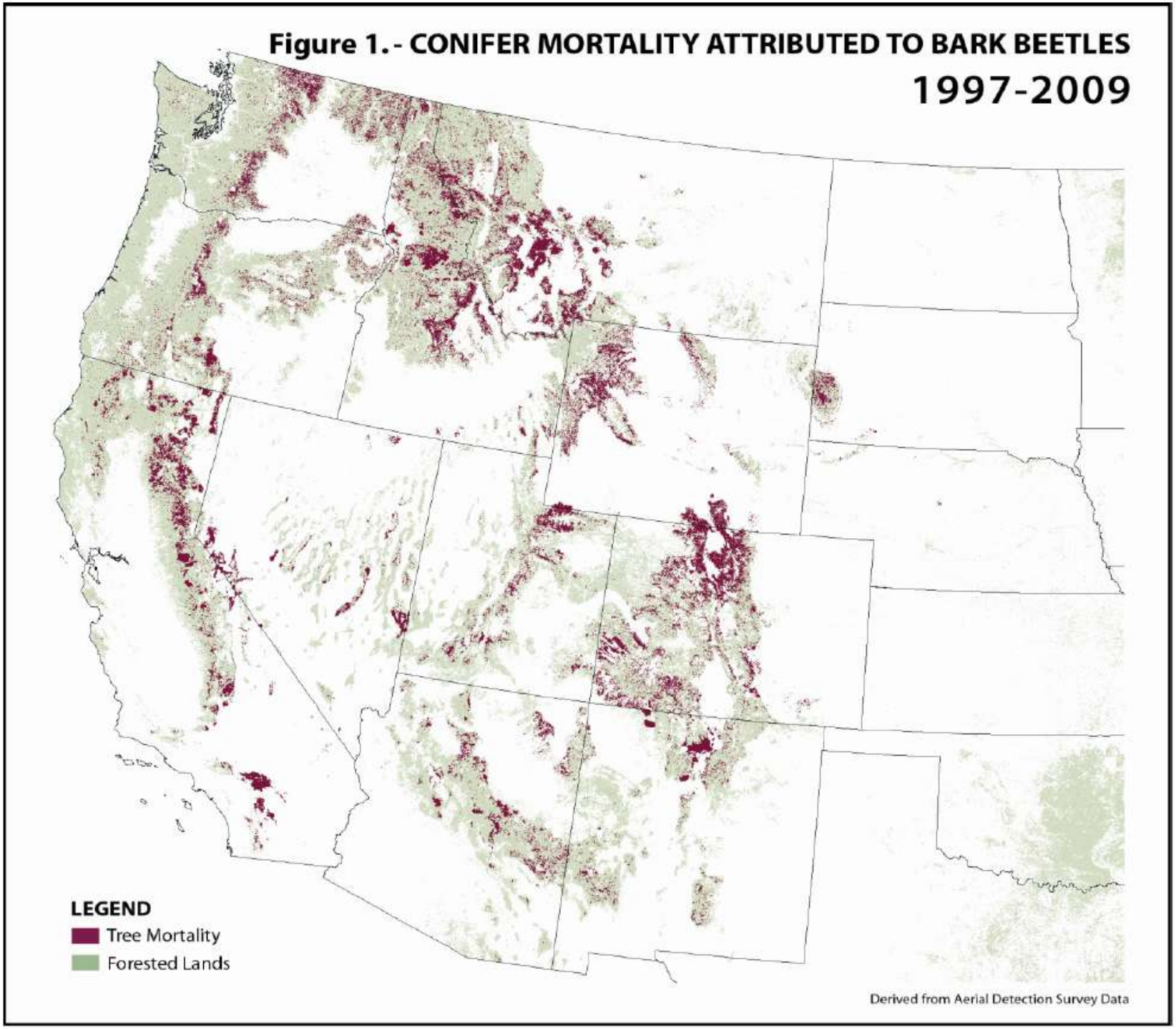
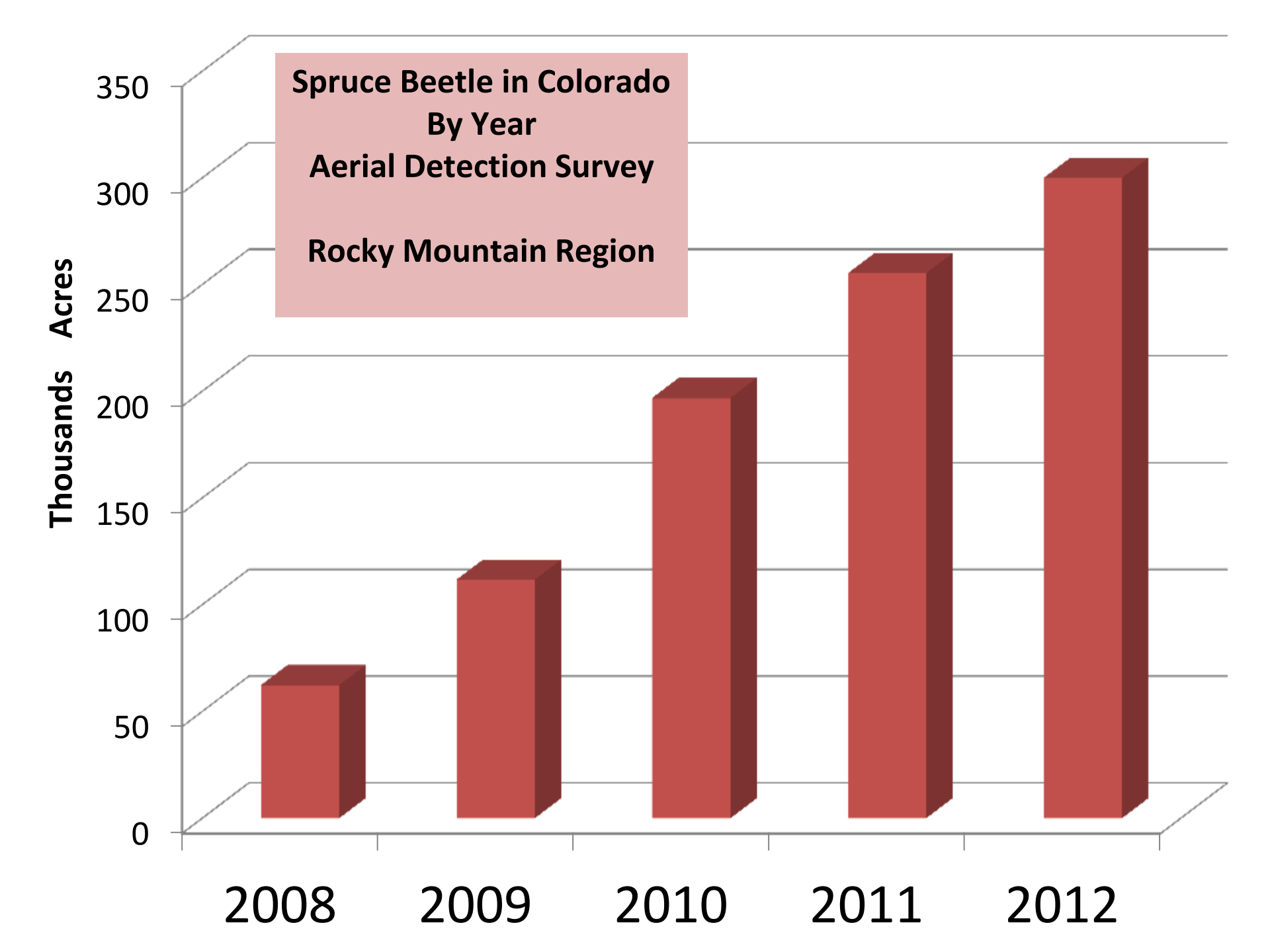
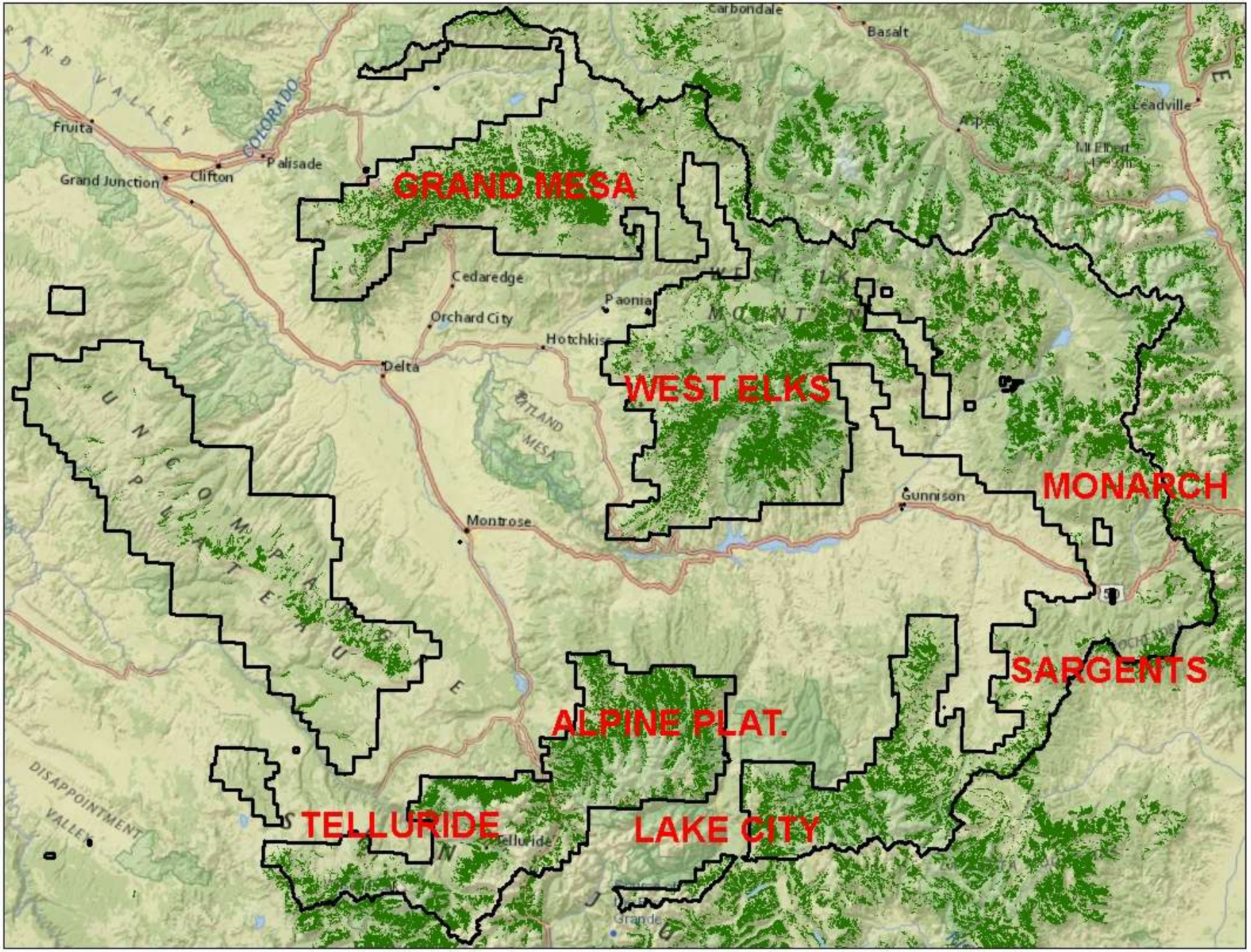
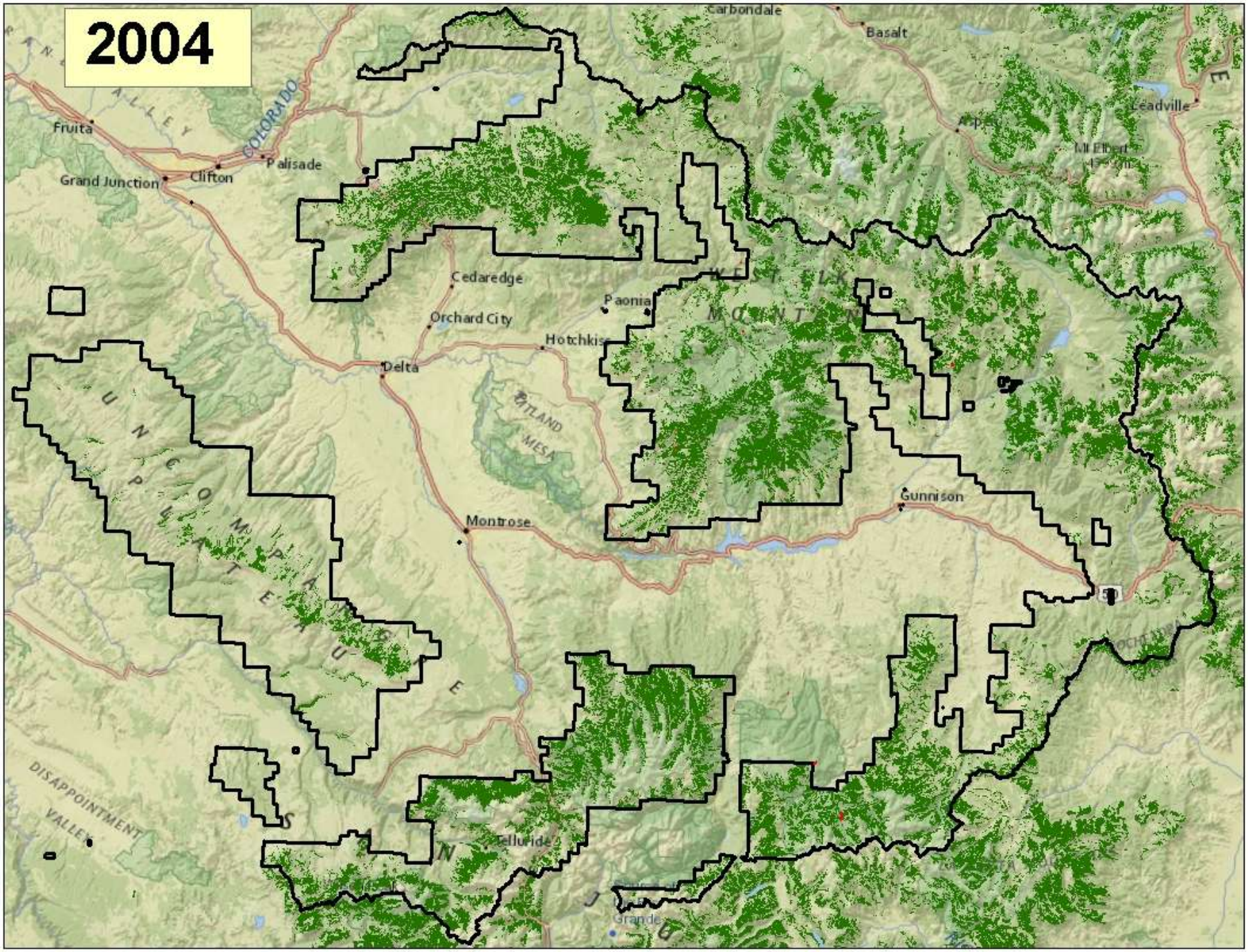
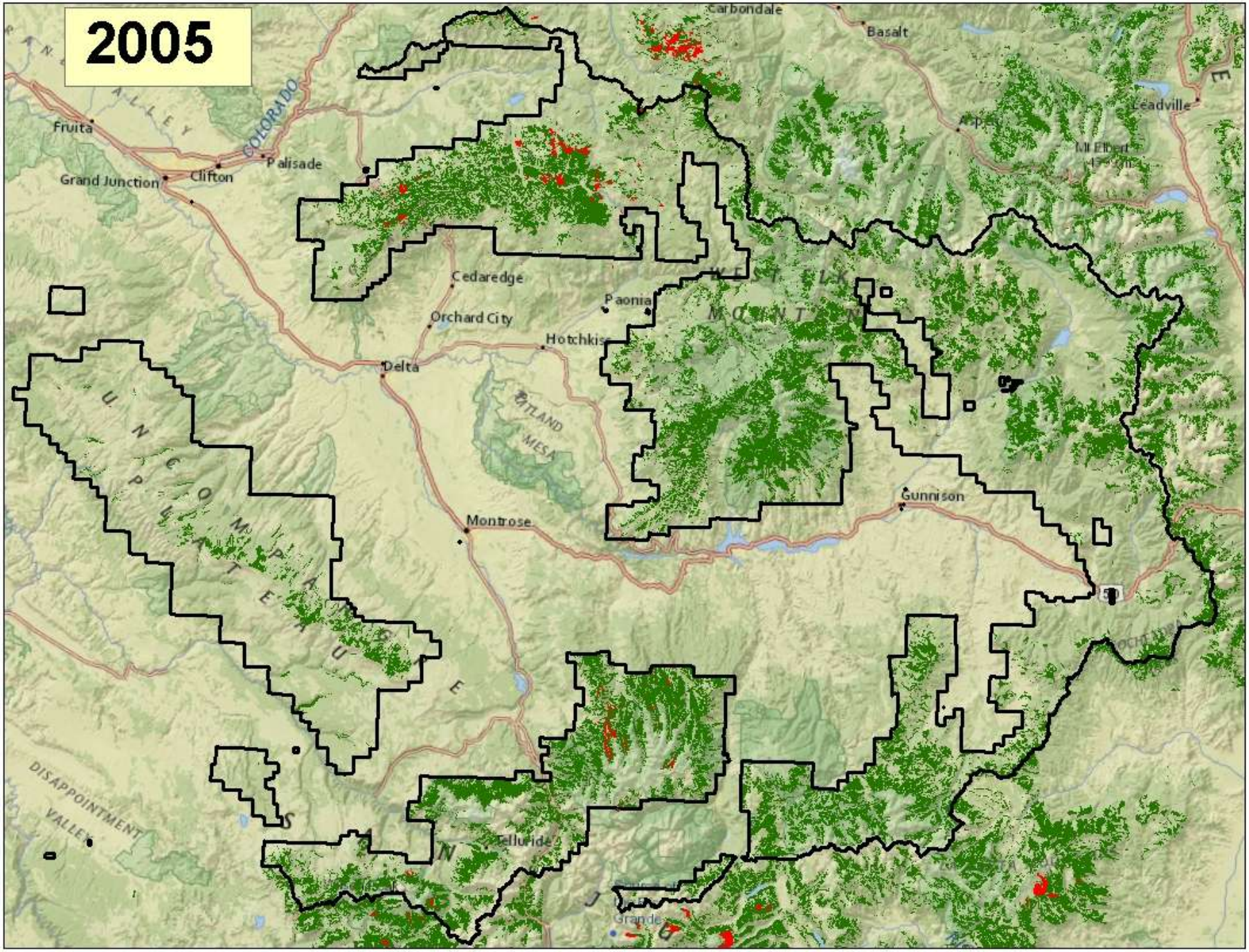


Figure 1. - CONIFER MORTALITY ATTRIBUTED TO BARK BEETLES
1997-2009
LEGEND
Tree Mortality
Forested Lands
Derived from Aerial Detection Survey Data


Spruce Beetle in Colorado
By Year
Aerial Detection Survey
Rocky Mountain Region
Thousands Acres
350
300
250
200
150
100
50
0
2008
2009
2010
2011
2012


GRAND MESA
WEST ELKS
MONARCH
SARGENTS
ALPINE PLAT.
TELLURIDE
LAKE CITY
Carbondale
Basalt
Leadville
Fruita
Grand Junction
Clifton
Palisade
Cedaredge
Orchard City
Paonia
Hotchkiss
Delta
Gunnison
Montrose
UNCOMPAHGRE PLATEAU
DISAPPOINTMENT VALLEY


2004
Carbondale
Basalt
Leadville
Fruita
Grand Junction
Clifton
Palisade
COLORADO
Cedaredge
Orchard City
Paonia
Hotchkiss
Delta
Montrose
Gunnison
UNCOMPAHGRE PLATEAU
DISAPPOINTMENT VALLEY
Telluride


2005
Carbondale
Basalt
Leadville
Fruita
Grand Junction
Clifton
Palisade
COLORADO
Cedaredge
Orchard City
Paonia
Hotchkiss
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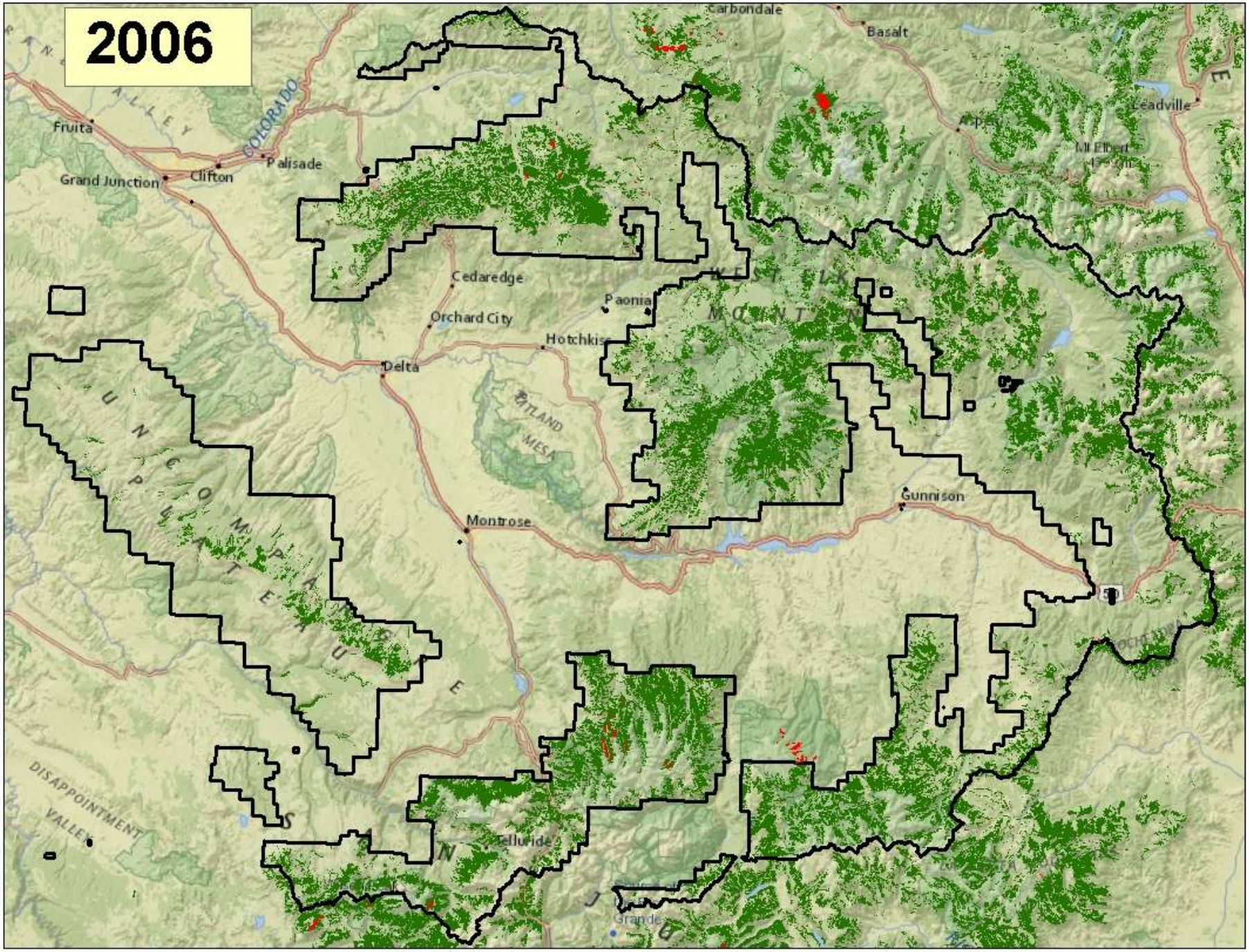
Telluride


2006
Carbondale
Basalt
Leadville
Fruita
Grand Junction
Clifton
Palisade
COLORADO
Cedaredge
Orchard City
Paonia
Hotchkiss
Delta
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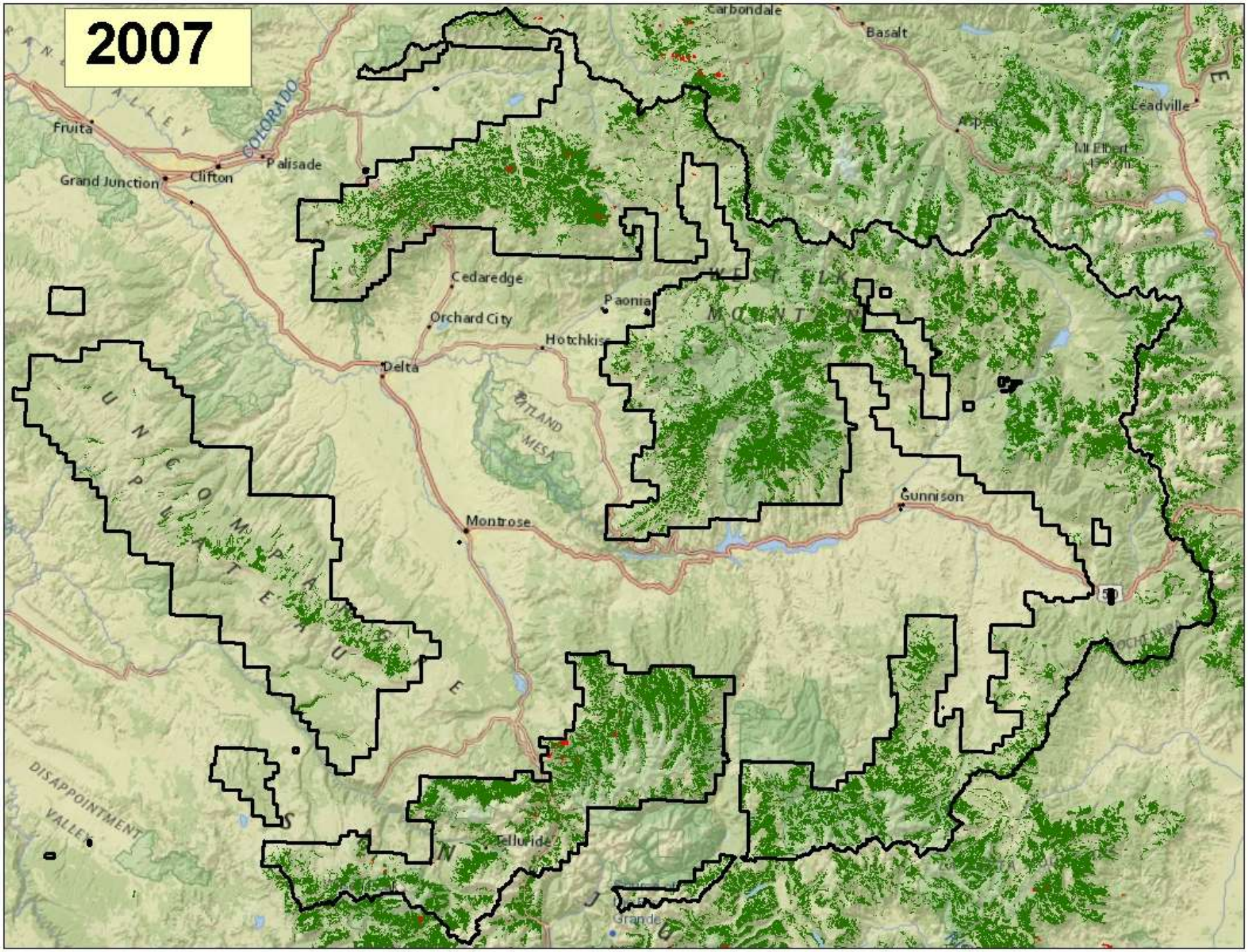
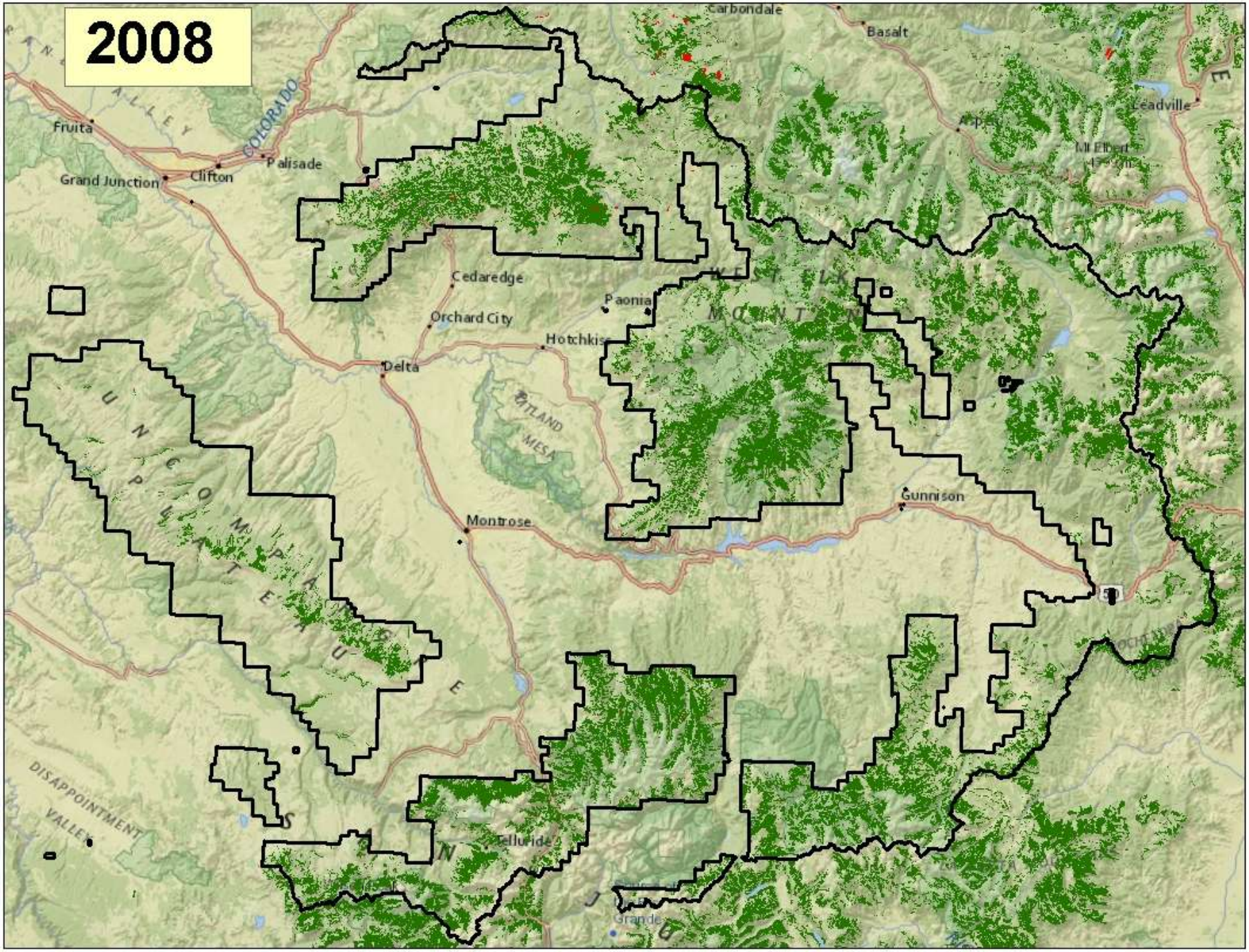
Gunnison
UNCOMPAHGRE PLATEAU
GRAND MESA
DISAPPOINTMENT VALLEY
Telluride


2007
Carbondale
Basalt
Leadville
Fruita
Grand Junction
Clifton
Palisade
COLORADO
Cedaredge
Orchard City
Paonia
Hotchkiss
Delta
WEST ELK MOUNTAINS
UNCOMPAHGRE PLATEAU
GRAND MESA
Gunnison
Montrose
Telluride
DISAPPOINTMENT VALLEY
SAN JUAN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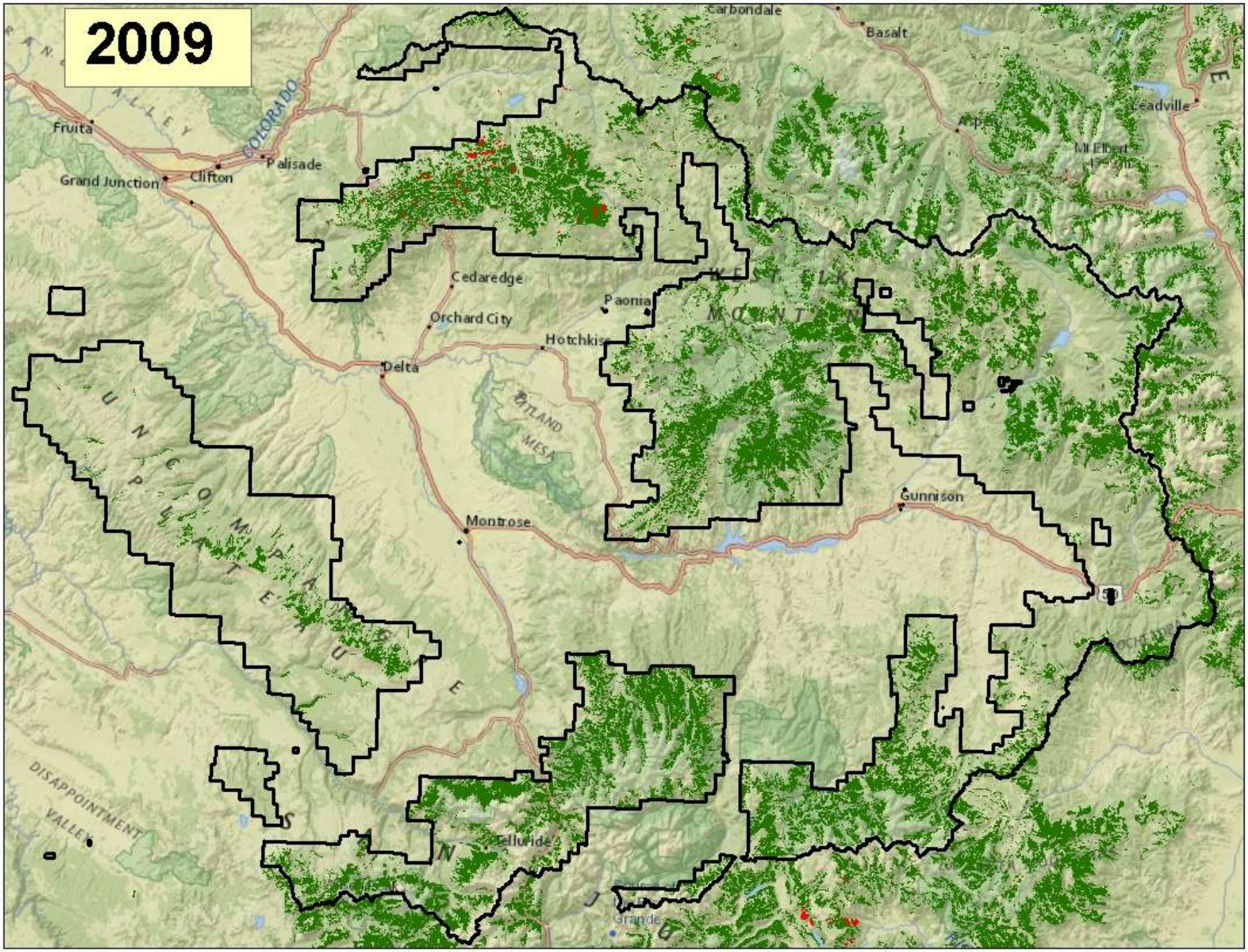
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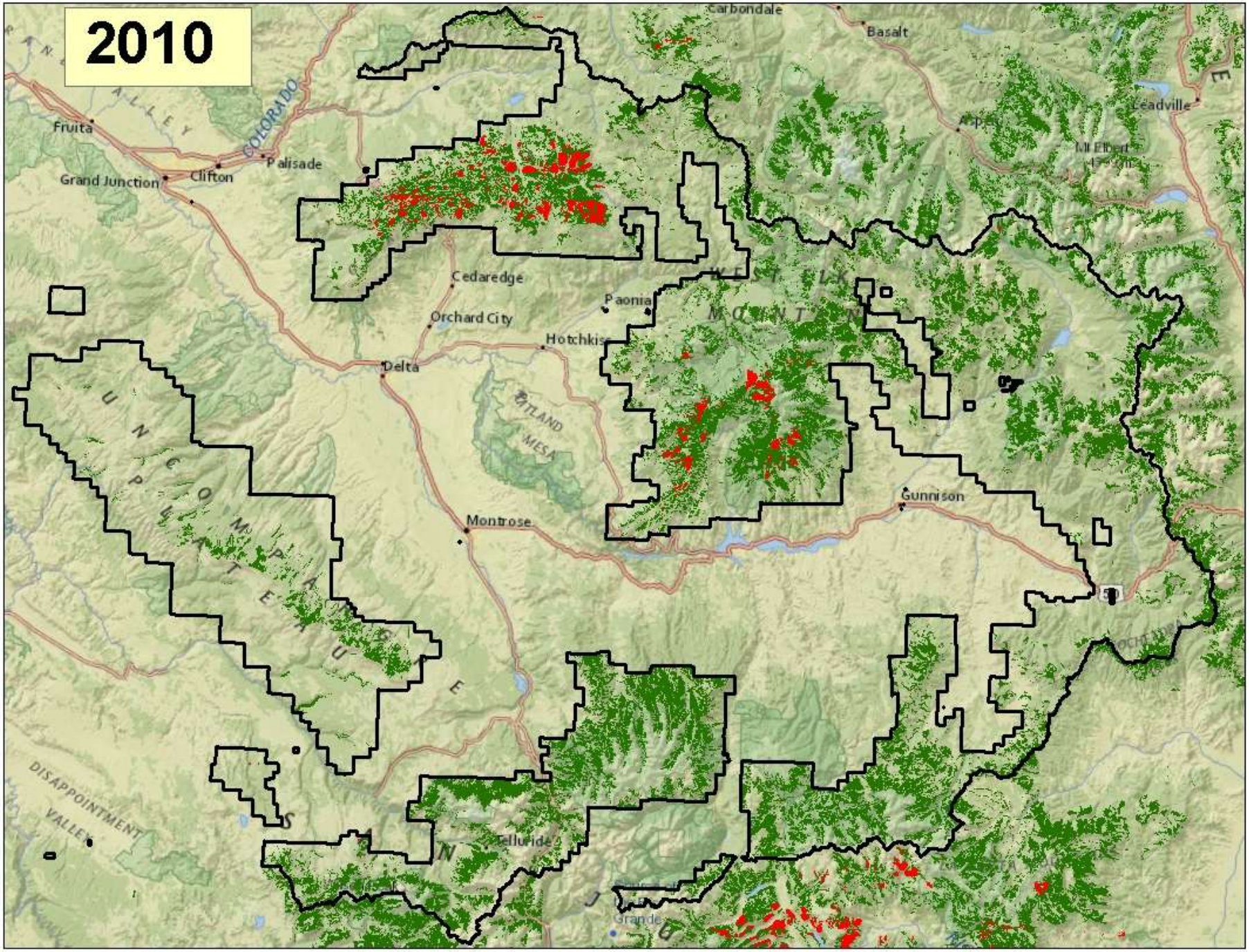
2010
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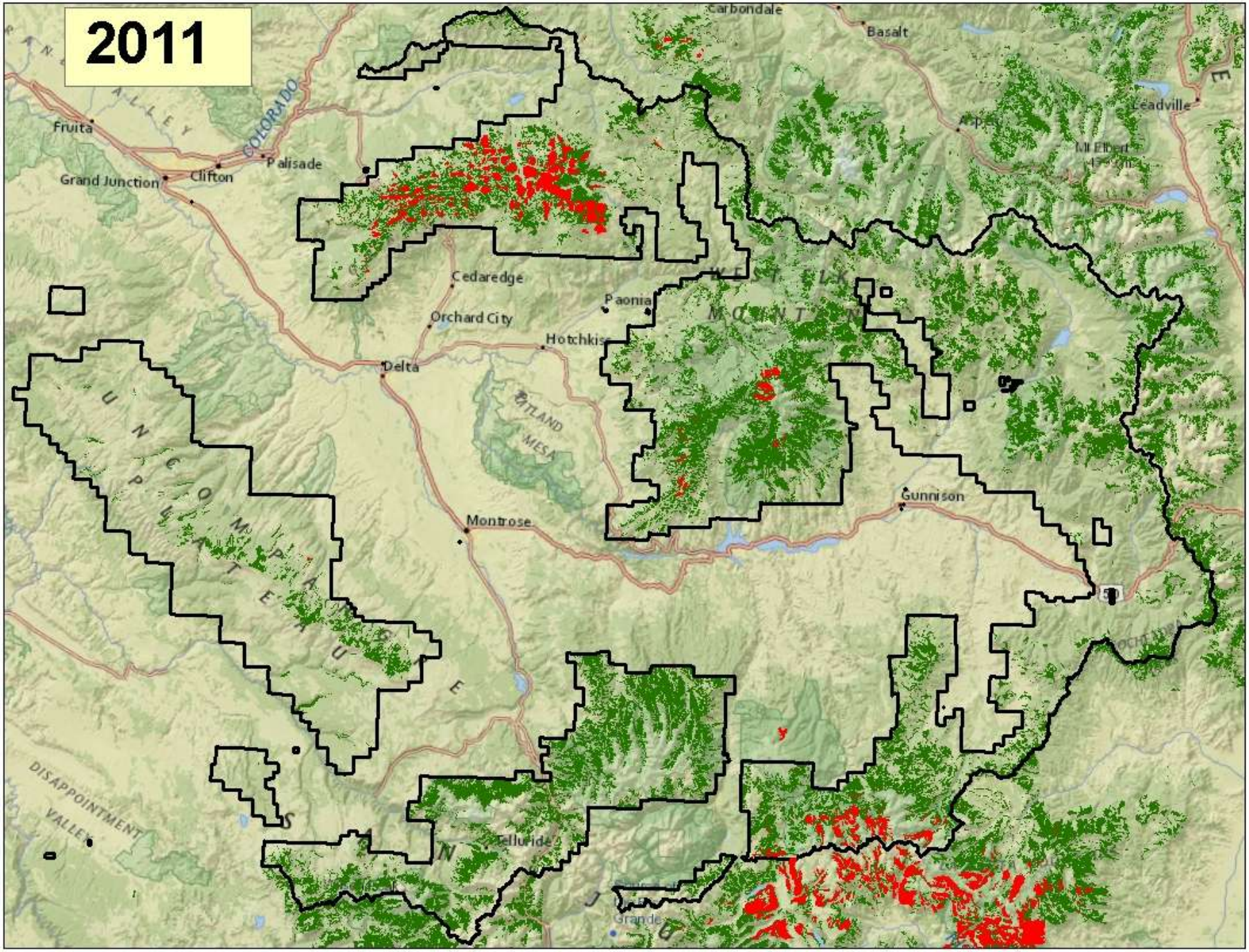
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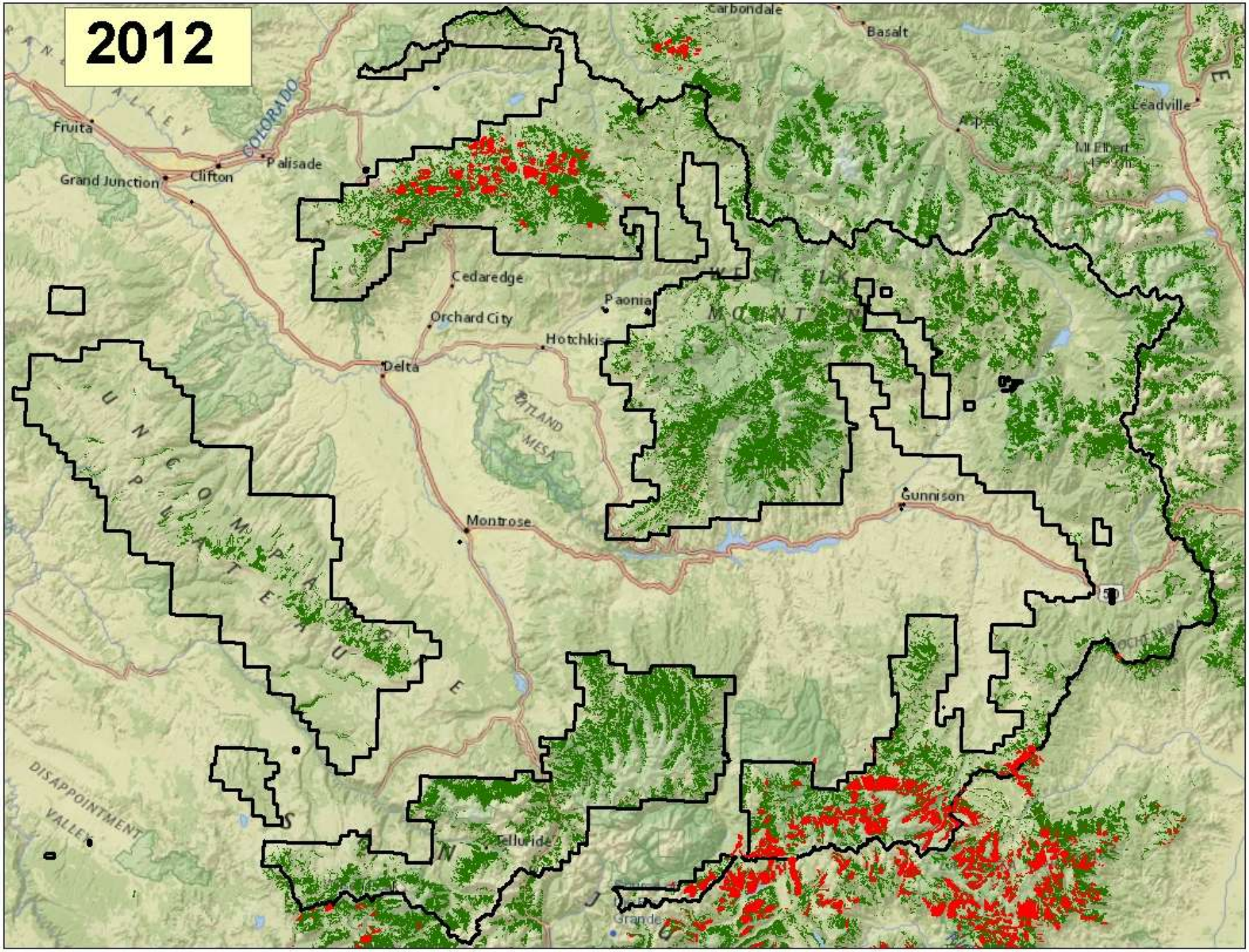
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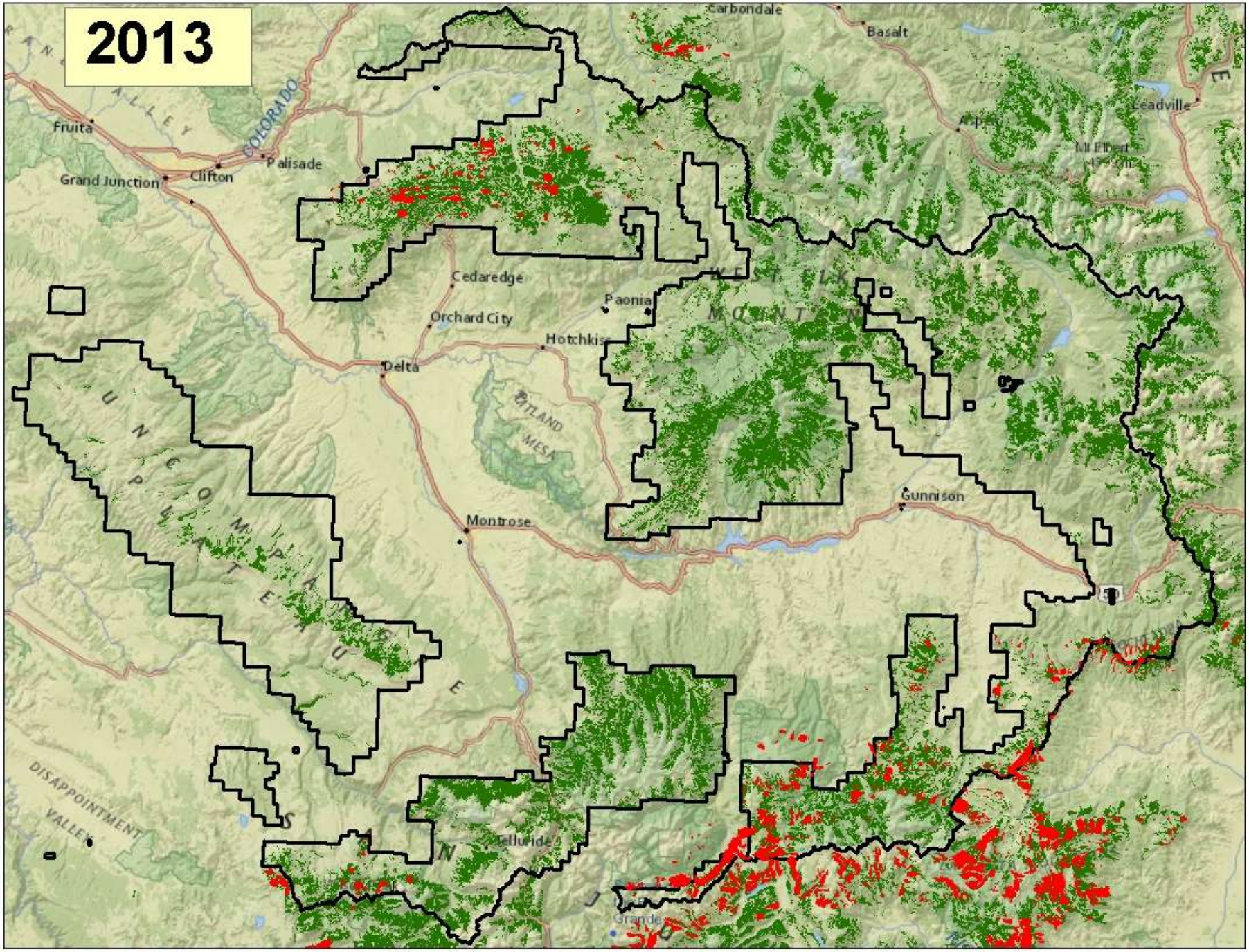
2013
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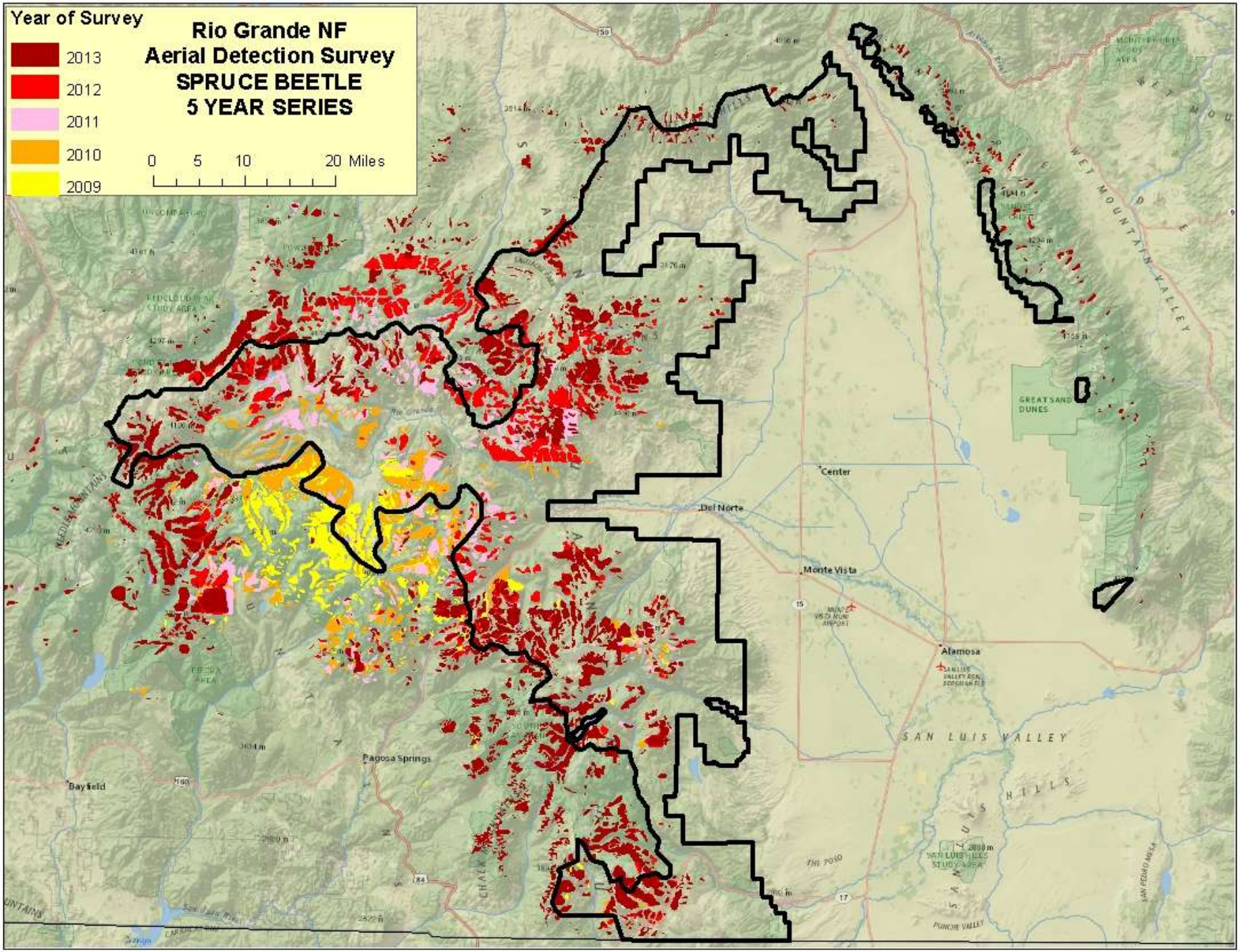

Year of Survey
2013
2012
2011
2010
2009
Rio Grande NF
Aerial Detection Survey
SPRUCE BEETLE
5 YEAR SERIES
0 5 10 20 Miles
Center
Del Norte
Monte Vista
Alamosa
Pagosa Springs
Bayfield
SAN LUIS VALLEY
GREAT SAND DUNES

Where the data comes from:
ADS – Aerial Detection Survey

ADS – Aerial Detection Survey

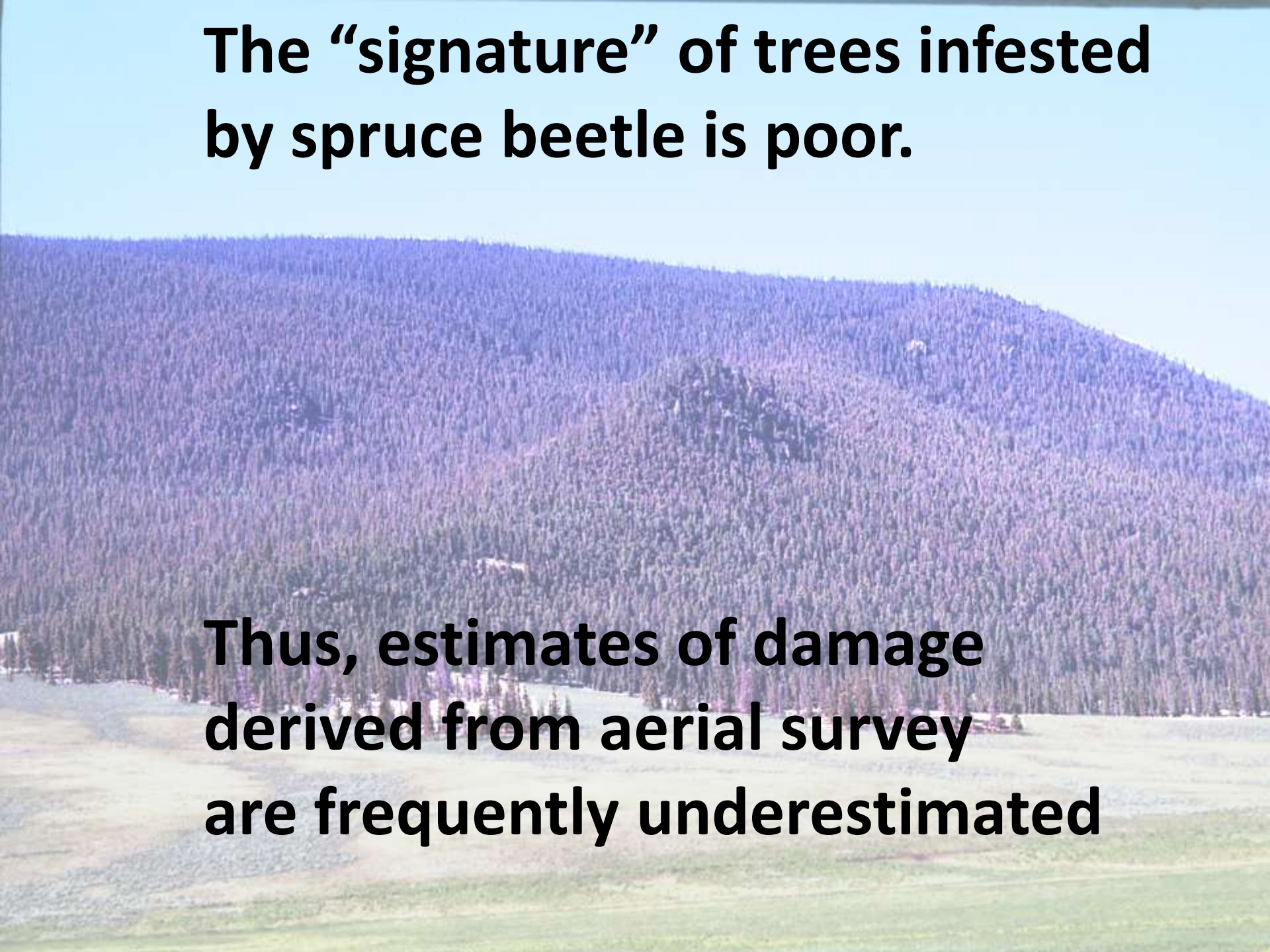
Not every acre is flown every year

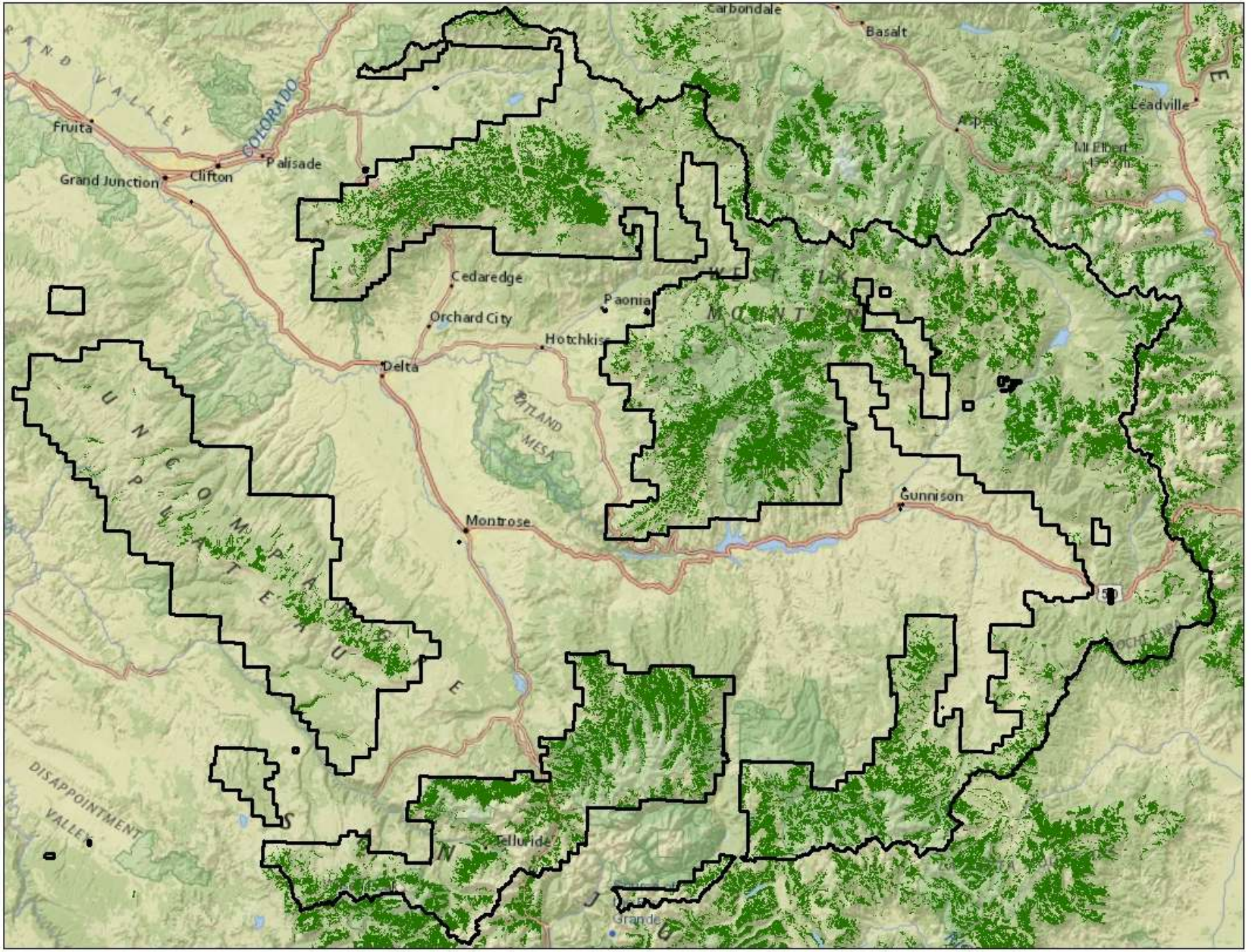
Attempt is made to record current mortality

Different agents cause different “signatures”

Is it an art or a science?

Best use is to indicate trends


The “signature” of trees infested by spruce beetle is poor.
Thus, estimates of damage derived from aerial survey are frequently underestimated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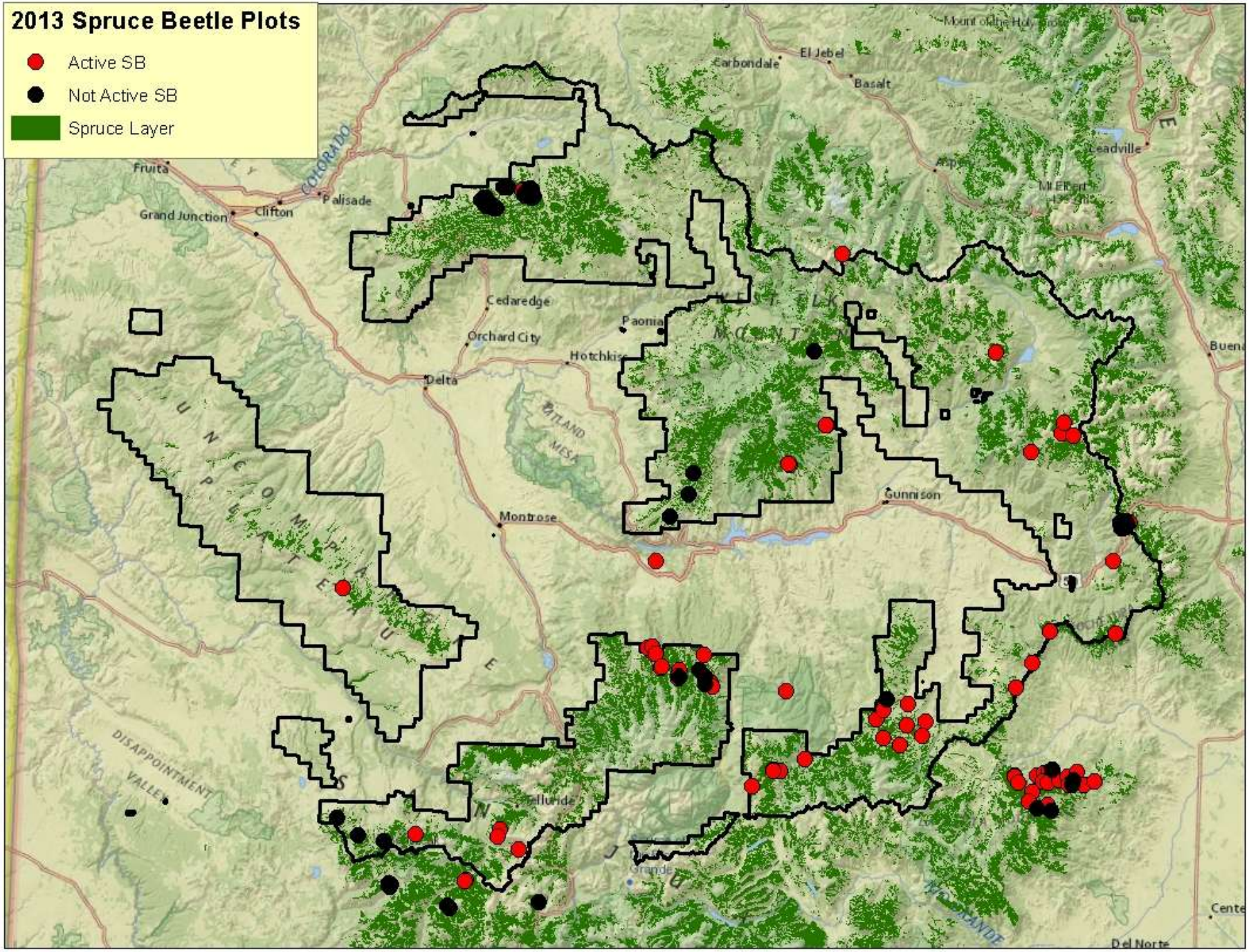
2013 Spruce Beetle Plots
Active SB
Not Active SB
Spruce Layer
Carbondale
El Jebel
Basalt
Leadville
Fruita
Grand Junction
Clifton
Palisade
COLORADO
Cedaredge
Paonia
Orchard City
Hotchkiss
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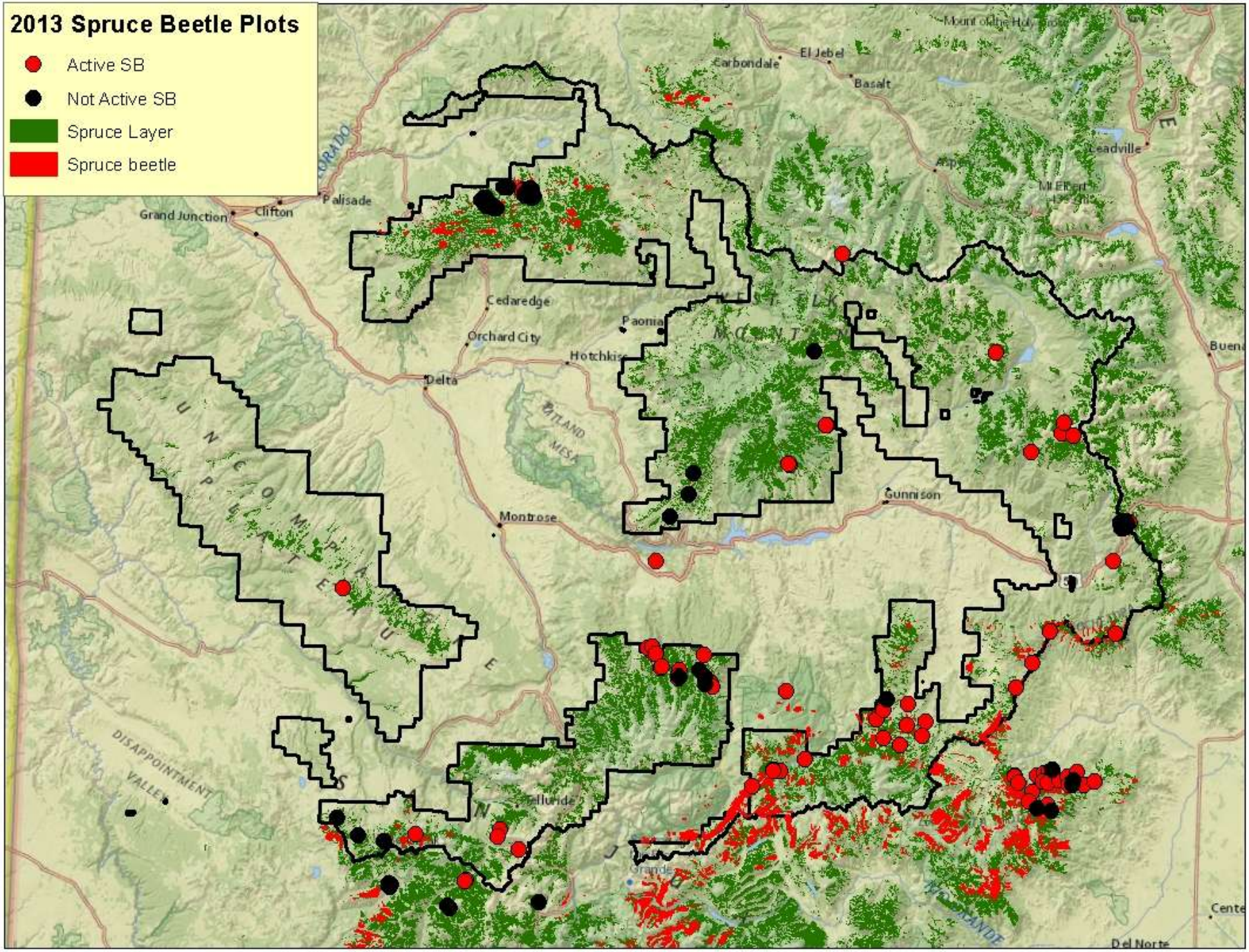
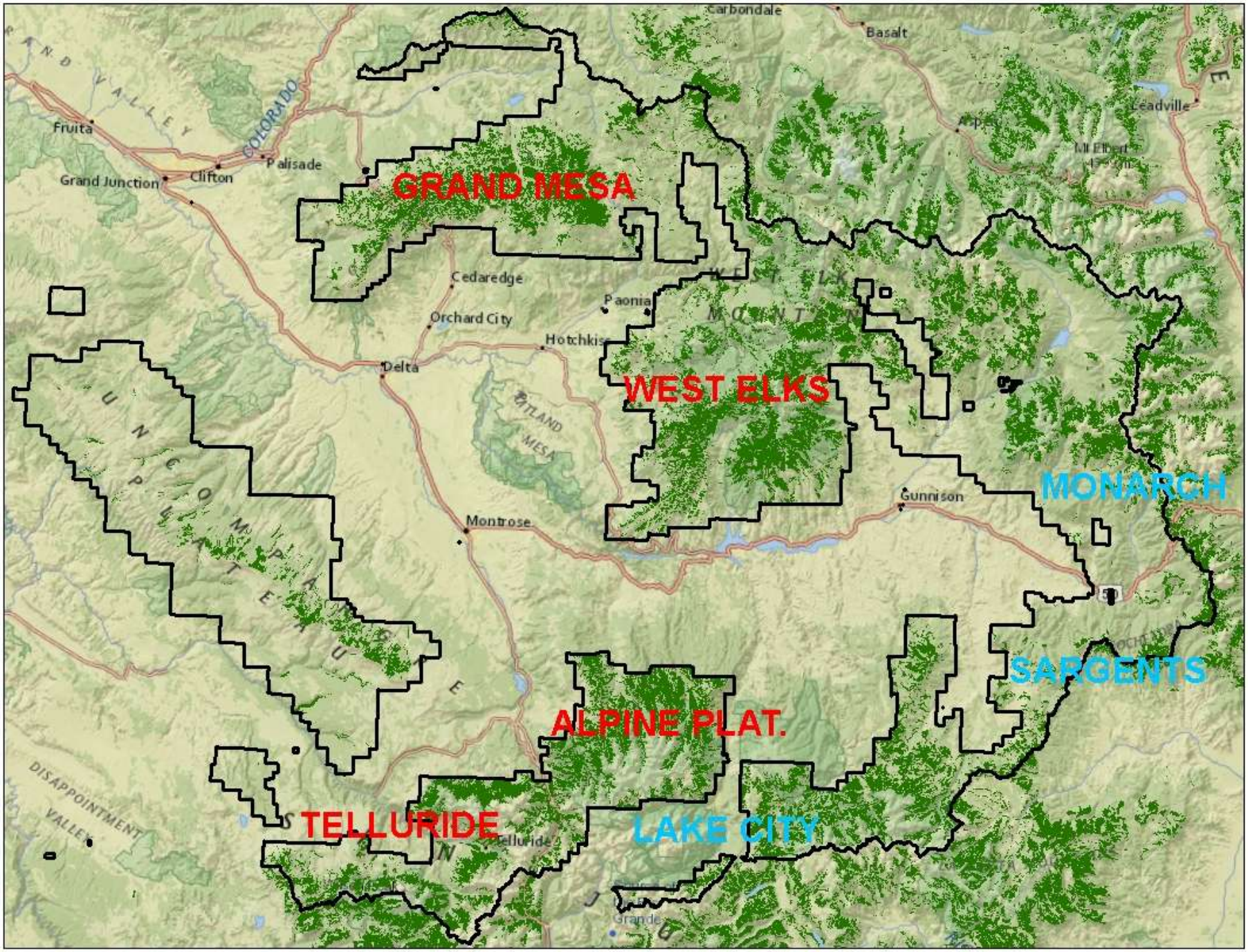
UNCOMPAHGRE PLATEAU
GRAND MESA
DISAPPOINTMENT VALLEY
Telluride
Del Norte


2013 Spruce Beetle Plots
Active SB
Not Active SB
Spruce Layer
Spruce beetle
Grand Junction
Clifton
Palisade
Carbondale
El Jebel
Basalt
Leadville
Cedaredge
Orchard City
Paonia
Hotchkiss
Delta
Montrose
Gunnison
Buena
Telluride
Del Norte
UNCOMPAHGRE PLATEAU
GRAND MESA
DISAPPOINTMENT VALLEY
SAN JUAN MOUNTAINS
RIO GRANDE

ERUPTIVE: Beetle populations are produced locally. Beetles are responding to on-site conditions

INUNDATIVE: Beetle populations are immigrating from other locations. Beetles are moving en masse.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WEST ELKS
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DISAPPOINTMENT VALLEY

It's not that bad . . .
It's worse!

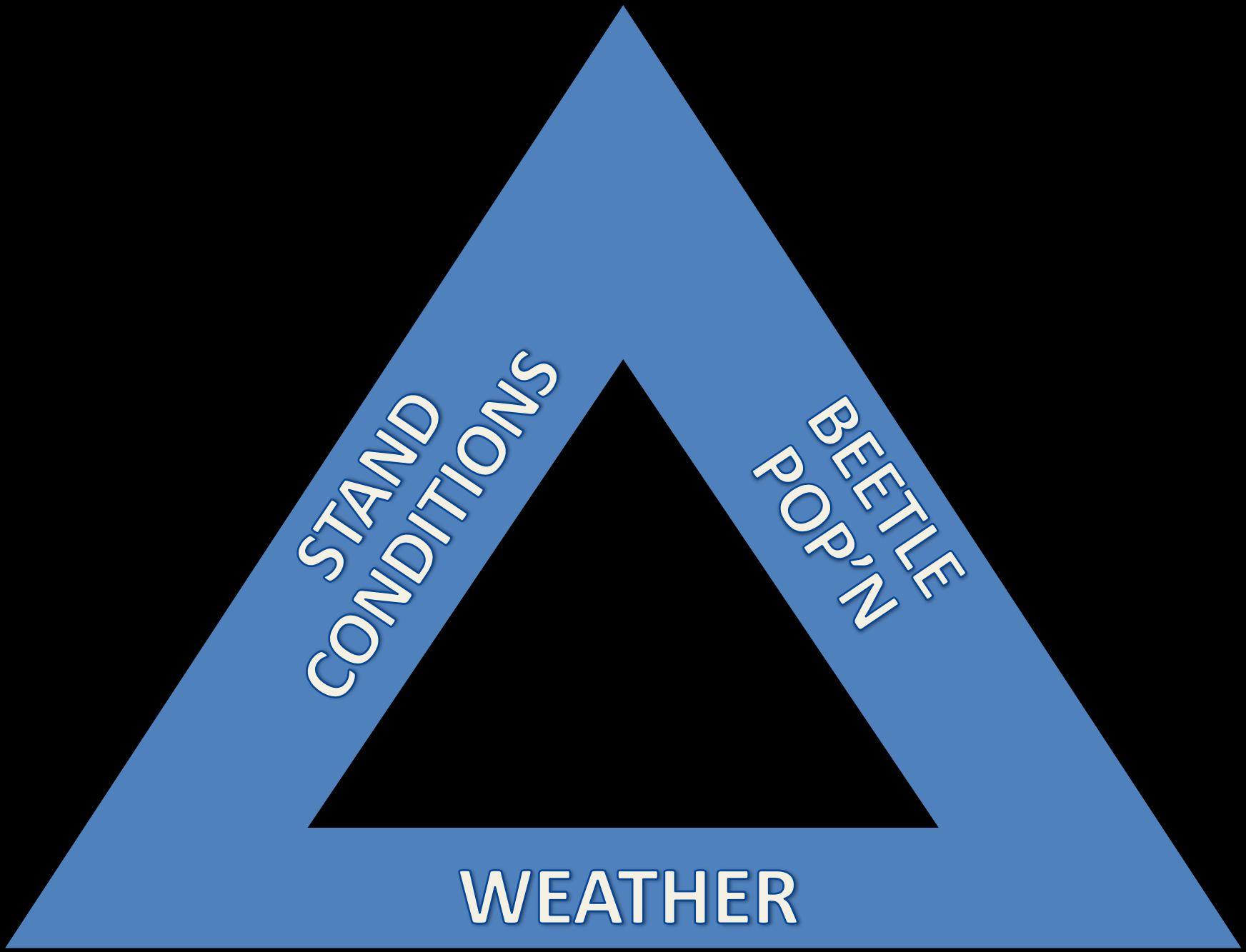
Trends of acres affected were still rising in 2013

Spruce beetle activity has notoriously poor signature

It will take several years for full extent to be seen

Extreme activity has resulted in death of "non-susceptible" hosts

Physiological rotation of spruce extremely long


STAND CONDITIONS
BEETLE POP'N
WEATHER

Natural Control

Natural Enemies
- Predators, Parasites and Pathogens

Weather conditions
- Unseasonable Frost
- Extreme cold

Exhaustion of the resource

Indirect Control

Silviculture

Schmid/Frye Spruce Beetle Risk Rating

- Site Index: Higher sites are at higher risk (creek bottoms)
- Average spruce diameter (larger spruce at greater risk)
- Stand basal area (Higher basal areas at greater risk)
- Proportion of spruce in stand (Higher percentage = greater risk)

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Decrease DBH

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Decrease DBH

Lower BA

Mixed species

Indirect Control

Silviculture

- Increase Species Mix
- Decrease Tree Size / Age
- Decrease Stand Density

Indirect Control

Silviculture
- Increase Species Mix
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- Decrease Stand Density

Direct Control

Pheromones

Sanitation
- (Salvage)

Trap Trees
- Removal
- Peeling
- Burning

Preventive Sprays

Indirect Control

Silviculture
- Increase Species Mix
- Decrease Tree Size / Age
- Decrease Stand Density

Direct Control

~~Pheromones~~

Sanitation
- (Salvage)

Trap Trees
- Removal
- Peeling
- Burning

Preventive Sprays

Sanitation Logging: Removal of infested material with the goal of removing beetles from the system

Salvage Logging: Removal of dead, dying and susceptible trees with the goal of obtaining revenue and/or initiating restoration

Spruce felled to act as “trap tree”

Preventative Spraying

Very effective

Requires specialized equipment

For high value trees

Many mature spruce may exceed the parameters

Safe, but environmental considerations

What does the future hold for the spruce forests of the GMUG National Forests?


富嶽三十六景 神奈川沖浪裏


YOU
ARE
HERE

RISK RATING FOR SB

Dominant Species Mix

Pure PIEN = 2, PIEN Mixed = 0

Dominant life Form Cover %

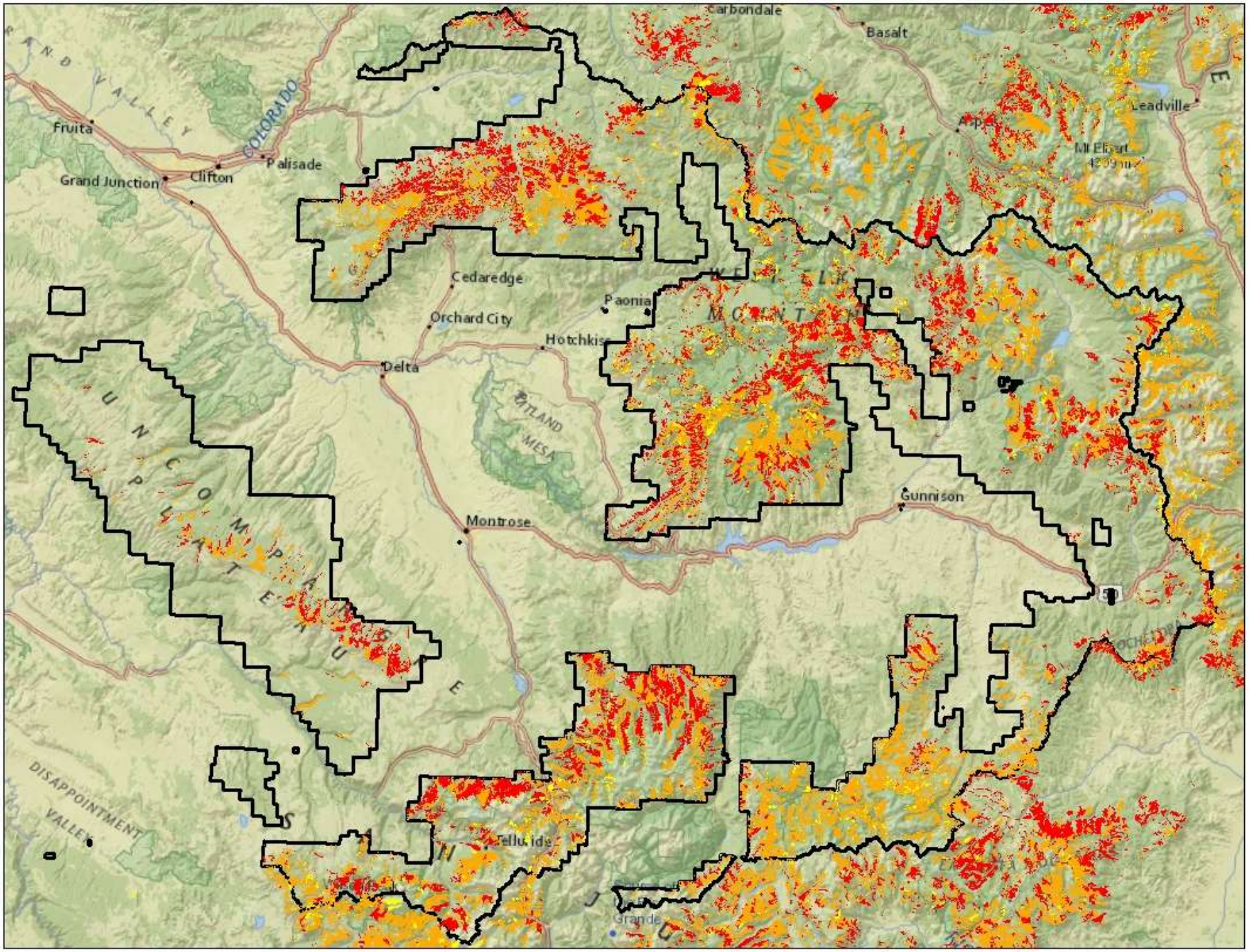
100 > 70 = 3, 69 > 30 = 2, <= 30 = 1

Size Class

V + L = 3, M = 2, S = 1, (E = 0)

Max Score = 8, Min score = 2

Red = 8,7 Orange = 6, 5 Yellow = 4,3,2


Carbondale
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BITLAND MESA
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Gunnison
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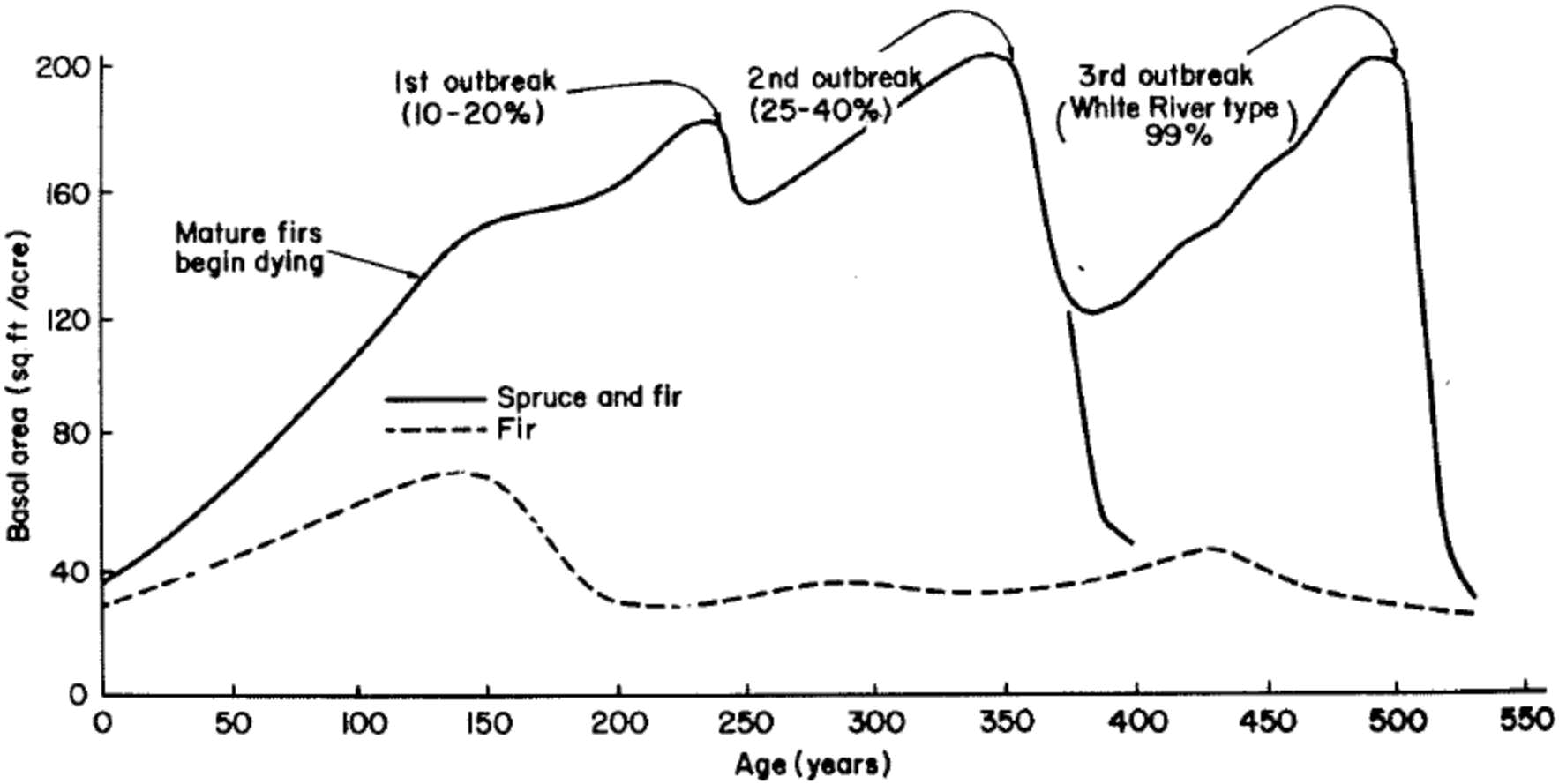
DISAPPOINTMENT VALLEY
Telluride

The State of Colorado has about 3.4 million acres (1.4 million ha) of spruce-fir sawtimber on commercial forests (Alexander 1974), most of which is old-growth and 75% of which is in either roadless or reserved categories (Cahill 1976).

Schmid and Frye. 1977. Spruce beetle in the Rockies. General Technical Report RM-49, 38 pp.



Schmid and Frye. 1977. Spruce beetle in the Rockies. General Technical Report RM-49, 38 pp.

An ounce of prevention is worth a pound of cure

- Benjamin Franklin


LUND

What does the future hold for the spruce forests of the GMUG National Forests?

What does the future hold for the spruce forests of the GMUG National Forests?

You tell me what the weather is going to do, I'll tell you what the beetles are going to do.

Search: spruce beetle Rio Grande